

What is claimed is:

1. A clutch device comprising:

a first member having a first conic surface;

a second member concentric with the first member and having a second conic

5 surface generally axially aligned with the first conic surface;

a race member fixed to the first conic surface; and

a slipper member positioned adjacent to the second conic surface in opposed  
relation to the race member, the race and slipper members having complementary  
projections to define pockets into which rollers are arranged,

10 wherein the first and second members are axially adjustable relative to one another  
between a first axial relationship in which the slipper is free of the second conic surface  
and a second axial relationship in which the slipper contacts the second conic surface.

2. The clutch device according to claim 1 wherein the first member is radially

15 outward relative to the second member.

3. The clutch device according to claim 1 wherein the first member is radially

inward relative to the second member.

20 4. The clutch device according to claim 1 wherein the second member is a  
portion of a planet carrier of a planetary gear stage.

5. The clutch device according to claim 1 wherein the first and second conic  
surfaces are each at angle in the range of 1 to 3 degrees.

6. The clutch device according to claim 5 wherein the first and second conic surfaces are each at angle of 1.5 degrees.

7. The clutch device according to claim 1 wherein the slipper member has an axial opening therethrough such that the slipper member is expandable or contractible.

8. The clutch device according to claim 7 wherein in the second axial relationship, the rollers are caused to climb the projections and thereby cause the slipper member to expand or contract into a fixed relationship with the second member second conic surface.

9. The clutch device according to claim 8 wherein in the second axial relationship, the rollers contact the projections at a pressure angle between 83 to 88 degrees.

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10. The clutch device according to claim 1 wherein the slipper member is configured to apply a prestress against the rollers.

11. The clutch device according to claim 1 wherein the race member and slipper member each have axial edges provided with radial flanges to retain the rollers within the pockets.

12. The clutch device according to claim 1 wherein a spring biases one of the first or second members to the first axial relationship.

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13. The clutch device according to claim 12 further comprising a fluid pressure source configured to selectively apply a fluid pressure force against the spring bias to move the first and second members in to the second axial relationship.

5 14. The clutch device according to claim 1 wherein in the first axial relationship a clearance in the range of 40-80 microns is provided between the slipper member and the second conic surface.

10 15. A method of forming a clutching device comprising the steps of:  
providing a first member having a first conic surface;  
fixing a race member to the first conic surface, the race member having a plurality of projections thereon and having a first axial end with a radially extending flange and a generally open second axial end;  
providing a second member having a second conic surface;  
15 providing a slipper member adjacent the second conic surface, the slipper member having a plurality of projections thereon and having a first axial end with a radially extending flange and a generally open second axial end;  
positioning the first member relative to the second member such that the race member is opposed to the slipper member and the race and slipper member projections  
20 define pockets;  
positioning rollers in to the pockets; and  
closing the race member second axial end and the slipper member second axial end to retain the rollers within the pockets.

16. The method according to claim 15 wherein the step of closing the race member second axial end and the slipper member second axial end includes providing a split disk tool adjacent to the race member first axial end and the slipper member first axial end.

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17. The method according to claim 16 wherein the step of closing the race member second axial end and the slipper member second axial end includes crimping the race member second axial end and the slipper member second axial end.